

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

What is Claimed:

1. (Currently Amended) A portable electric heater for providing a heated exhaust air stream at an elevation above a support surface, said portable electric heater comprising:
 - an elongate housing having at least one sidewall, a top end, a bottom end, and a longitudinal length extending substantially upward from said bottom end to said top end, and a horizontal cross sectional area;
 - a base for supporting said elongate housing in a vertical and upright position on said support surface, said base contacting said support surface;
 - at least one interior space within said elongate housing;
 - at least one inlet opening in said elongate housing allowing inlet air to enter said at least one interior space;
 - an air blower assembly disposed within said at least one interior space for receiving said inlet air, said air blower assembly comprising:
 - i) at least one non-axial air impeller having a substantially vertical axis of rotation; and
 - ii) at least one motor for rotating said non-axial air impeller about said substantially vertical axis of rotation to generate an exhaust air stream;
 - at least one vertically oriented elongate outlet opening in said elongate housing allowing said exhaust air stream to exit said at least one interior space; and

at least one vertically oriented elongate electric heating element disposed within said at least one interior space between said air blower assembly and said at least one outlet opening;

wherein the flow of said exhaust air stream from said non-axial air impeller toward said at least one vertically oriented elongate outlet opening is a substantially direct and straight vector;

~~wherein a substantial portion substantially all of said exhaust air stream passes through is heated by said at least one vertically oriented elongate electric heating element and thermal energy is transferred from said at least one electric heating element to said exhaust air stream as said exhaust air stream flows through said at least one electric heating element~~ forming said heated exhaust air stream;

wherein said heated exhaust air stream exits said elongate housing at an elevation above said support surface, said elevation being defined by a distance from where said base contacts said support surface to a highest vertical exit point of said heated exhaust air stream from said at least one interior space; and

wherein said elevation of said heated exhaust air stream is about 20 inches or greater.

2. (Original) The portable electric heater of claim 1, wherein an overall length is defined by the distance from where said base contacts said support surface to said top end of said elongate housing.

3. (Original) The portable electric heater of claim 2, wherein said overall length is about 25 inches or greater.

4. (Original) The portable electric heater of claim 3, having a vertical aspect ratio defined by said overall length to a maximum width dimension of said horizontal cross sectional area of said elongate housing, wherein said vertical aspect ratio is greater than about 2 to 1.
5. (Original) The portable electric heater of claim 3, wherein said base comprises a maximum width dimension of a horizontal cross section through said base, and said maximum width dimension of said horizontal cross section through said base is less than about 60% of said overall length.
6. (Original) The portable electric heater of claim 1, wherein a first comparative ratio is defined by said elevation of said heated exhaust air stream to a maximum width dimension of said horizontal cross sectional area of said elongate housing, said first comparative ratio being greater than about 2 to 1.
7. (Original) The portable electric heater of claim 1, wherein said air blower assembly further comprises a transverse blower assembly.
8. (Currently Amended) The portable electric heater of claim 7-1, wherein said air blower assembly is a pre-assembled cartridge, and said pre-assembled cartridge is pre-tested and installed in said elongate housing during assembly of said portable electric heater.
9. (Original) The portable electric heater of claim 1, wherein said air blower assembly further comprises a centrifugal blower assembly.

10. (Currently Amended) The portable electric heater of claim 1, wherein said non-axial air impeller further comprises:

a diameter of said non-axial air impeller; and

a length of said non-axial air impeller; and

a ratio of said length of said non-axial air impeller to said diameter of said non-axial air impeller being greater than about 2:1.

11. (Original) The portable electric heater of claim 1, further comprising a controller for controlling at least one function of said portable electric heater.

12. (Original) The portable electric heater of claim 11, wherein said controller is mounted to one of said elongate housing and said base.

13. (Original) The portable electric heater of claim 11, wherein said controller is a remote control device.

14. (Original) The portable electric heater of claim 11, wherein said motor further comprises a variable speed motor having one or more rotational speeds, and said controller controls said rotational speeds.

15. (Original) The portable electric heater of claim 1, wherein said elongate housing rotates or oscillates relative to said support surface, wherein said rotation or oscillation is about an axis of rotation, said axis of rotation being substantially aligned with a vertical longitudinal axis of said elongate housing.

16. (Currently Amended) The portable electric heater of claim 15, wherein said axis of rotation of said elongate housing is substantially parallel to the said substantially vertical axis of rotation of said at least one non-axial air impeller of said air blower assembly.

17. (Original) The portable electric heater of claim 15, further comprising a mechanism for rotating or oscillating said elongate housing relative to said support surface.

18. (Original) The portable electric heater of claim 17, wherein said mechanism is disposed between said bottom end of said elongate housing and said base.

19. (Original) The portable electric heater of claim 17, further comprising a controller for controlling a function of said mechanism for rotating or oscillating said elongate housing with respect to said support surface.

20. (Currently Amended) The portable electric heater of claim 1, wherein said at least one outlet opening further comprises an-a single elongate outlet opening in said at least one sidewall and oriented substantially along said longitudinal length of said elongate housing, wherein said elongate outlet opening allows said heated exhaust air stream to exit said interior space as an-a substantially contiguous elongate heated exhaust air stream.

21. (Original) The portable electric heater of claim 1, further comprising a grill covering said at least one outlet opening.

22. (Original) The portable electric heater of claim 21, wherein a highest elevation of an extent of said grill above said support surface is about 21 inches or greater.

23. (Original) The portable electric heater of claim 21, wherein said grill further comprises air directing vanes that can be positioned to direct said heated exhaust air stream exiting said elongate housing to a desired location.

24. (Original) The portable electric heater of claim 21, wherein said grill is an integral part of said elongate housing.

25. (Currently Amended) The portable electric heater of claim 21, further comprising an air containment frame disposed between said at least one vertically oriented elongate electric heating element and said grill, wherein said air containment frame is a distinct and separate part from said grill.

26. (Currently Amended) The portable electric heater of claim 25, further comprising air alignment elements disposed between said at least one vertically oriented elongate electric heating element and said grill, wherein said alignment elements are distinct and separate parts from said grill.

27. (Original) The portable electric heater of claim 26, wherein said air containment frame and said air alignment elements are integral to each other as a single part.

28. (Currently Amended) The portable electric heater of claim 26, wherein at least one of said air containment frame or said air alignment elements are integral to at least one of said housing or said at least one vertically oriented elongate electric heating element.

29. (Original) The portable electric heater of claim 1, wherein heated exhaust air stream exiting said elongate housing comprises a substantially contiguous elongated column of heated exhaust air.

30. (Currently Amended) The portable electric heater of claim 1, wherein said at least one vertically oriented elongate electric heating element is a positive temperature coefficient (PTC) heating element capable of producing about 1500 watts of energy, said vertically oriented elongate electric heating element having a vertical aspect ratio defined by a length of said vertically oriented elongate electric heating element being greater than a width of said vertically oriented elongate electric heating element.

31. (Currently Amended) The portable electric heater of claim 30, wherein said at least one vertically oriented elongate electric heating element comprises ~~an-a single~~ elongate electric heating element disposed proximate said outlet opening and ~~is~~-oriented substantially along said longitudinal length of said elongate housing, ~~said vertically oriented elongate electric heating element having a vertical aspect ratio defined by a length of said vertically oriented elongate electric heating element being greater than a width of said vertically oriented elongate electric heating element.~~

32. (Currently Amended) The portable electric heater of claim 31-30, wherein said vertical aspect ratio of said vertically oriented elongate electric heating element is greater than about 7.5:1.

33. (Currently Amended) The portable electric heater of claim 31-30, wherein said length of said vertically oriented elongate electric heating element is about 13 inches or greater.

34. (Currently Amended) The portable electric heater of claim 31-30, wherein said width of said vertically oriented elongate electric heating element is about 1.5 inches or less.

35. (Currently Amended) The portable electric heater of claim 31-30, wherein said vertically oriented elongate electric heating element utilizes_comprises a row of PTC ceramic stones flanked on at least one side by heat dissipation fins.

36. (Original) The portable electric heater of claim 35, wherein said row of PTC ceramic stones is a single row aligned substantially linearly in a substantially vertical orientation.

37. (Currently Amended) The portable electric heater of claim 31-30, wherein further comprising a second comparative ratio is-defined by said elevation of said heated exhaust air stream to said width of said vertically oriented elongate electric heating element, said second comparative ratio being greater than about 12 to 1.

38. (Original) The portable electric heater of claim 1, wherein said base is a unitary part of said elongate housing.

39. (Original) The portable electric heater of claim 1, wherein said base is detachably coupled to said elongate housing having i) an operating configuration when said base is coupled to said elongate housing and ii) a non-operating configuration when base is detached from said elongate housing.

40. (Original) The portable electric heater of claim 39, wherein said non-operating configuration is disposed in a package for shipment.

41. (Original) The portable electric heater of claim 39, wherein said base further comprises a split base having at least a first portion and a second portion that can be separated.

42. (Original) The portable electric heater of claim 1, wherein said support surface is a substantially vertical surface and further comprising at least one mounting means for mounting said portable electric heater to said substantially vertical surface.

43. (Original) The portable electric heater of claim 42, wherein said at least one mounting means and said base comprise a unitary component.

44. (Original) The portable electric heater of claim 42, wherein said at least one mounting means and said elongate housing comprise a unitary component.

45. (Original) The portable electric heater of claim 42, wherein said at least one mounting means is a bracket.

46. (Currently Amended) A portable electric heater for providing a heated exhaust air stream at an elevation above a support surface, said portable electric heater comprising:
an elongate housing having at least one sidewall, a top end, a bottom end, and a longitudinal length extending substantially upward from said bottom end to said top end, and a horizontal cross sectional area;

a base for supporting said elongate housing in a vertical and upright position on said support surface, said base contacting said support surface;

at least one interior space within said elongate housing;

at least one vertically oriented elongate electric heating element disposed within said at least one interior space and oriented substantially along said longitudinal length of said elongate housing, a length of said at least one vertically oriented elongate electric heating element being about 13 inches or greater;

at least one inlet opening in said elongate housing allowing inlet air to enter said at least one interior space;

an air blower assembly disposed within said at least one interior space between said at least one inlet opening and said at least one vertically oriented elongate electric heating element, said air blower assembly comprising: i) at least one non-axial air impeller; ii) at least one motor for rotating said non-axial air impeller about a substantially vertical axis of rotation to receive said inlet air and generate an exhaust air stream; and

at least one vertically oriented elongate outlet opening in said elongate housing allowing said heated exhaust air stream to exit said at least one interior space;

wherein ~~a substantial portion~~ substantially all of said exhaust air stream passes through said at least one vertically oriented elongate electric heating element and thermal energy is transferred from said at least one vertically oriented elongate electric heating element to said exhaust air stream as said exhaust air stream flows through said at least one vertically oriented elongate electric heating element to form said heated exhaust air stream.

47. (Original) The portable electric heater of claim 46, wherein said heated exhaust air stream exits said elongate housing at an elevation above said support surface, said elevation being defined by a distance from where said base contacts said support surface to the highest vertical exit point of said heated exhaust air stream from said at least one interior space.

48. (Currently Amended) The portable electric heater of claim 47, comprising a comparative ratio defined by said elevation of said heated exhaust air stream to a width of said vertically oriented elongate electric heating element, said comparative ratio being at greater than about 12 to 1.

49. (Original) The portable electric heater of claim 47, wherein said elevation of said heated exhaust air stream is about 20 inches or greater.

50. (Currently Amended) The portable electric heater of claim 46, wherein said at least one vertically oriented elongate electric heating element is a positive temperature coefficient (PTC) heating element.

51. (Currently Amended) The portable electric heater of claim 50, wherein a width of said at least one vertically oriented elongate electric heating element is about 1.5 inches or less.

52. (Original) The portable electric heater of claim 50, further comprising a row of PTC ceramic stones flanked on at least one side by heat dissipation fins, wherein said row of PTC ceramic stones is a single row aligned substantially linearly in a substantially vertical orientation.

53. (Currently Amended) The portable electric heater of claim 50, wherein said at least one vertically oriented elongate electric heating element further comprises a vertical aspect ratio greater than about 7.5:1, defined by said length of said at least one vertically oriented

elongate electric heating element being greater than a width of said at least one vertically oriented elongate electric heating element.

54. (Original) The portable electric heater of claim 46, wherein said heated exhaust air stream exiting said elongate housing comprises a single substantially contiguous elongated column of heated exhaust air.

55. (Original) The portable electric heater of claim 46, further comprising a grill covering said at least one outlet opening.

56. (Original) The portable electric heater of claim 55, wherein a highest elevation of an extent of said grill above said support surface is about 21 inches or greater.

57. (Currently Amended) A portable electric heater for providing a heated exhaust air stream at an elevation above a support surface, said portable electric heater comprising:
an elongate housing having at least one sidewall, a top end, a bottom end, and a longitudinal length extending substantially upward from said bottom end to said top end, and a horizontal cross sectional area;

a base for supporting said elongate housing in a vertical and upright position on said support surface, said base contacting said support surface;

an overall length defined by the distance from where said base contacts said support surface to said top end of said elongate housing, wherein said overall length being about 25 inches or greater;

said elongate housing further comprising a maximum width dimension of said horizontal cross sectional area, a vertical aspect ratio defined by said overall length to said maximum width dimension and being greater than about 2 to 1;

at least one interior space within said elongate housing;

at least one inlet opening in said elongate housing allowing inlet air to enter said at least one interior space;

at least one vertically oriented elongate outlet opening in said elongate housing
allowing a heated exhaust air stream to exit said at least one interior space;

at least one vertically oriented elongate electric heating element disposed within said
at least one interior space proximate said at least one vertically oriented elongate outlet
opening; and

an air blower assembly disposed within said at least one interior space ~~for proximate~~
~~said at least one vertically oriented elongate electric heating element, said air blower~~
~~assembly receiving said inlet air from said at least one inlet opening and discharging an~~
~~exhaust air stream toward said at least one vertically oriented elongate electric heating~~
~~element, said air blower assembly comprising: at least one non-axial air impeller and at least~~
~~one motor for rotating said non-axial air impeller about a substantially vertical axis of~~
~~rotation to generate said exhaust air stream;~~

~~said at least one air impeller further comprising:~~

- ~~i) a length of said at least one air impeller,~~
- ~~ii) a diameter of said at least one air impeller, and~~
- ~~iii) an aspect ratio of said length of said at least one air impeller to said~~
~~diameter of said at least one air impeller being greater than 2 to 1;~~

~~at least one outlet opening in said elongate housing allowing said exhaust air stream to exit said at least one interior space; and~~

~~at least one electric heating element disposed within said at least one interior space between said air blower assembly and said at least one outlet opening;~~

wherein a longitudinal length of said non-axial air impeller, said elongated electric heating element, and said outlet opening are each substantially vertically aligned and substantially horizontally aligned and the flow of said exhaust air stream from said non-axial air impeller toward said elongate electric heating element is a substantially direct and straight vector;

wherein ~~a substantial portion~~ substantially all of said exhaust air stream passes through is heated by said at least one vertically oriented elongate electric heating element and ~~thermal energy is transferred from said at least one electric heating element to said exhaust air stream as said exhaust air stream flows through said at least one electric heating element~~ forming said heated exhaust air stream;

wherein the flow of said heated exhaust air stream from said at least one vertically oriented elongate electric heating element toward said at least one vertically oriented elongate outlet opening is a substantially direct and straight vector.

58. (Original) The portable electric heater of claim 57, wherein said base is a unitary part of said elongate housing.

59. (Original) The portable electric heater of claim 57, wherein said base is decoupled from said elongate housing in a non-operating configuration.

60. (Original) The portable electric heater of claim 59, wherein said base further comprises a split base having at least a first portion and a second portion that can be separated.

61. (Original) The portable electric heater of claim 59, wherein said non-operating configuration is disposed in a package for shipment from a place of manufacturing to a place of sale.

62. (Original) The portable electric heater of claim 57, wherein said base further comprising a maximum width dimension of a horizontal cross section through said base and said maximum width dimension of a horizontal cross section through said base is less than about 60% of said overall length.

63. (Original) The portable electric heater of claim 57, wherein said heated exhaust air stream exits said elongate housing at an elevation above said support surface, said elevation being defined by a distance from where said base contacts said support surface to the highest vertical exit point of said heated exhaust air stream from said at least one interior space.

64. (Original) The portable electric heater of claim 63, wherein said elevation of said heated exhaust air stream is about 20 inches or greater.

65. (Currently Amended) A portable electric heater for providing a heated exhaust air stream, said portable electric heater comprising:

a housing having at least one sidewall, a top end, a bottom end, and a length extending substantially upward from said bottom end to said top end, and a horizontal cross sectional area;

a base for supporting said housing in a upright position on a support surface, said base contacting said support surface;

at least one interior space within said housing;

at least one inlet opening in said housing allowing inlet air to enter said at least one interior space;

an air blower assembly disposed within said at least one interior space having an inlet port for receiving said inlet air and an exhaust port for discharging an exhaust air stream, said air blower assembly comprising:

i) at least one non-axial air impeller; and

ii) at least one motor for rotating said non-axial air impeller about a substantially vertical axis of rotation to generate ansaid exhaust air stream;

at least one outlet opening in said housing allowing said exhaust air stream to exit said at least one interior space;

at least one vertically oriented elongate electric heating element disposed within said at least one interior space between said air blower assembly and said at least one outlet opening;

a grill covering said at least one outlet opening; and

an air containment frame disposed between said vertically oriented elongate electric heating element and said grill, wherein said air containment frame is a distinct and separate part from said grill;

wherein said exhaust port of said air blower assembly, said elongate heating element, and said elongate outlet opening have substantially the same orientation and are aligned;

wherein a substantial portion substantially all of said exhaust air stream passes through exiting said exhaust port of said air blower assembly is heated by said at least one vertically oriented elongate electric heating element and thermal energy is transferred from said at least one electric heating element to said exhaust air stream as said exhaust air stream flows through said at least one electric heating element forming said heated exhaust air stream; and

wherein said containment frame prevents the said heated exhaust air stream from expanding into an area between said vertically oriented elongate electric heating element and said grill.

66. (Currently Amended) The portable electric heater of claim 65, further comprising air alignment elements disposed between said vertically oriented elongate electric heating element and said grill, wherein said alignment elements are distinct and separate parts from said grill.

67. (Original) The portable electric heater of claim 66, wherein said air containment frame and said air alignment elements are integral to each other as a single part.

68. (Currently Amended) The portable electric heater of claim 66, wherein at least one of said air containment frame or said air alignment elements are integral to at least one of said housing or said at least one vertically oriented elongate electric heating element.

69. (Original) The portable electric heater of claim 65, wherein an overall length is defined by the distance from where said base contacts said support surface to said top end of said housing.

70. (Original) The portable electric heater of claim 69, further comprising a vertical aspect ratio defined by said overall length to a maximum width dimension of said horizontal cross sectional area of said elongate housing, wherein said vertical aspect ratio is greater than about 2 to 1.

71. (Original) The portable electric heater of claim 70, wherein a highest elevation of an extent of said grill above said support surface is about 21 inches or greater.

72. (Original) The portable electric heater of claim 65, wherein said grill is an integral part of said housing.

73. (Currently Amended) The portable electric heater of claim 65, wherein said at least one vertically oriented elongate electric heating element ~~comprises an elongate electric heating element, said elongate electric heating element~~ further comprises a vertical aspect ratio defined by a length of said vertically oriented elongate electric heating element being greater than a width of said vertically oriented elongate electric heating element.

74. (Currently Amended) The portable electric heater of claim 73, wherein said at least one vertically oriented elongate electric heating element is a positive temperature coefficient (PTC) heating element.

75. (Currently Amended) The portable electric heater of claim 74, wherein said length of said at least one vertically oriented elongate electric heating element is about 13 inches or greater.

76. (Currently Amended) The portable electric heater of claim 74, wherein said vertical aspect ratio of said at least one vertically oriented elongate electric heating element is greater than about 7.5:1.

77. (Currently Amended) The portable electric heater of claim 74, wherein said width of said at least one vertically oriented elongate electric heating element is about 1.5 inches or less.

78. (Original) The portable electric heater of claim 74, further comprising a row of PTC ceramic stones flanked on at least one side by heat dissipation fins, wherein said row of PTC ceramic stones is a single row aligned substantially linear in a substantially vertical orientation.